

expressed, and are in the main in touch with the teachings of modern sanitarians.

It is to be regretted that in this chapter the author allows his personal antagonism to Koch's doctrine of disinfection to weaken his arguments and conclusions. That the followers of Koch sometimes carried disinfection too far does not detract from the value of Koch's original observations.

Prof. Hueppe lays peculiar stress on the importance of making infectious disease impossible by removing the predisposition to disease, but he scoffs at the idea of combating disease by warring directly with the germs of disease. Although there is a great deal to be learnt from this chapter, it seems a pity that so able a writer should have marred his own work by a captious criticism of Koch's able investigations.

The last chapter (pp. 440-455) deals with the "History of Bacteriology." Ably written though it is, it, like the first chapter, appears to be foreign to the general scope of the book.

In summary of the book as a whole, it may be said that it affords more ground for serious thought and reflection than perhaps any of the works on bacteriology hitherto published. The original and able manner in which the author attacks biological problems of great difficulty and complexity deserves all praise, and we can cordially recommend the book, not only to bacteriologists pure and simple, but also to those physicians who recognize the limitations of medical science.

Much praise is due to the translator. Mr. Jordan's worth as a bacteriologist is well known and fully appreciated. By giving us this translation of Hueppe's work he has added to his reputation. A. C. HOUSTON.

SUNSHINE AND WINE-GROWING.

Vinification dans les Pays chauds—Algérie et Tunisie.

Par J. Dugast. Pp. 281 ; 58 figures. (Paris : Carré et C. Naud, 1900.)

ACCORDING to the preface, valuable scientific and technical works on the production of wine in temperate climates have been published both in France and elsewhere ; but so far the special problems which are encountered by wine-growers in the warm climates of such countries as Algeria and Tunis have remained unnoticed. The present work is intended by the author to fill this blank. But although it has been written specially with a view to describe the difficulties peculiar to wine-making in a warm climate and the means of overcoming them, the author has done more than this, for he has found it advisable, in order to make his purpose quite clear, to embody his special subject in a general scientific and technical description of wine-making. As he has had very considerable practical and scientific experience in his subject, the result is a work well worth the attention of all interested in the making of wine.

The most common difficulty of the Algerian wine-grower, and one which is very rare in the more temperate climate of France, is due to the must, or grape juice, very frequently containing too little acid and too much sugar as a result of very active plant assimilation induced by excessive solar radiation. Deficiency of acid is apt

not only to affect injuriously the flavour of the resulting wine, but also to induce unsoundness ; the latter effect being caused by the low acidity of the wine favouring the growth of injurious bacteria, which the higher acidity of a normal wine tends to inhibit, owing to the well-known fact that an acid medium is unfavourable to the development of most ferment bacteria.

The means employed to remove the difficulty of want of acidity, which are described by the author, let us into secrets of wine-making which some may perhaps be inclined to think border on sophistication. Plastering is one which is undoubtedly objectionable. It consists in adding calcium sulphate to the crushed grapes, which results in the formation, from the cream of tartar present in the must, of sulphate of potash. But this method, though evidently made use of by many wine-growers, is condemned by the author, and also discouraged by the French law, which limits the amount of sulphate of potash to two grammes per litre.

Other methods for increasing the acidity of the must are : crushing a certain quantity of unripe sour grapes with the ripe ones ; the addition of tartaric acid to the must previous to fermentation ; and sprinkling the grapes in the wine-press with, what the author styles, di-calcic phosphate. The latter treatment is said to result in the formation of acid phosphate of potash, a salt considered by the author to be less objectionable than sulphate of potash.

Excess sugar in the must acts detrimentally by throwing too much work on the yeast, which is itself apt to be crippled in the hot climate of Algeria by an exceedingly high fermentation temperature. Mention is made of the fermentation temperature at times rising to upwards of 115° F.—which in itself is sufficient to arrest the fermentation functions of most yeasts.

About 20 per cent. of sugar is considered the most favourable amount for a wine must to contain, and if the saccharometer shows that it exceeds this amount, the best remedy appears to be the simple and inexpensive use of the pump.

An interesting point, about which much has been said of late years, is raised by the author when he deals with the question of the use of pure selected yeasts in the fermentation of wine. It has been advanced by certain upholders of this system that the characteristic flavour or bouquet of most well-known wines is produced in the main by the variety or species of yeast natural to the grapes of the district, and that, if pure cultures of such yeasts are made use of in the fermentation of foreign musts, the flavour of the resulting wines assume the character of the wines of the district from which the yeasts were obtained.

The idea is evidently one of the greatest importance to the wine industry, as it holds out hopes of improving the wine of poor districts into something like, let us say, first quality clarets or Burgundies. The author of this book states that selected yeasts have been much used by the wine-growers of Algeria, and he claims to have had ample opportunities for studying the results. The conclusion he arrives at is that the yeast from a noted growth of wine, when added to an ordinary must, is quite powerless to confer on it the special qualities of the wine from which it comes ; and he further concludes

that yeast has little, if any, influence on the bouquet of wine. The true character of a wine, he maintains, is due to numerous factors, among which the variety of grape and the character of the soil and climate preponderate; and the yeast does produce any flavour, it is indistinguishable among these.

If, however, the author passes adverse judgment on selected yeasts regarding their power of conferring flavour, he does not do so with regard to their use for setting up a rapid and healthy fermentation in wine must. For this purpose he advocates their use warmly, but insists on the employment of a selected indigenous yeast as more calculated to be in harmony with the environment than if it was derived from a foreign source.

The valuable results which have accrued from Emil C. Hansen's remarkable studies on yeast have already led to so many successful results in technical practice, that we still feel inclined to suspend judgment regarding the non-efficiency of wine yeast in the matter of flavour until M. Dugast's interesting observations are confirmed in other quarters.

In conclusion, we call special attention to this book as likely to be useful to our Colonial wine-growers of Australia and the Cape; the climate of these countries is somewhat similar to that of Algeria, and no doubt some of the special difficulties discussed in this book are also met with in these countries.

A. J. B.

THE FAUNA OF THE SHETLANDS.

A Vertebrate Fauna of the Shetland Islands. By A. H. Evans and T. E. Buckley. Pp. xxix + 248. (Edinburgh: D. Douglas, 1899.)

ALTHOUGH it would be too high a meed of praise to say that the authors have done for the Shetlands what Gilbert White did for Selborne (the systematic treatment of the fauna not being favourable to colloquial writing), there is no doubt that they have succeeded in producing a very interesting volume, and one which should be indispensable to every visitor to the most northern group of the British Islands, whether or no he be specially interested in birds. For in place of restricting themselves to a detailed account of the various members of their vertebrate fauna, Messrs. Evans and Buckley have furnished a very interesting description of the more striking physical features of these islands, together with numerous notes on the people and their mode of life. But perhaps the most generally attractive feature of the work will be the exquisite views of Shetland scenery with which it is adorned; these illustrations reflecting the highest credit alike on the photographer and on the artist responsible for their reproduction in the present form. In introducing these scenic pictures, in place of figures of the birds recorded as members of the fauna, the authors have undoubtedly exercised a wise discretion. In only one instance have they made a natural history object the chief feature of an illustration; the one exception being the beautiful plate of the nest and young of the great skua—a bird of all-absorbing interest to the naturalist in the Shetlands.

And here it is proper to mention that the volume before us forms a part of the vertebrate fauna of Scotland, of which several volumes by Messrs. Harvie-Brown

and Buckley have already appeared. It seems that Mr. Evans, who has an extensive personal acquaintance with the Shetlands, had an idea of writing an independent work on its animals. The securing his services as a contributor to the larger undertaking will commend itself to all.

After devoting fifty-four pages to a well-written description of the physical features of the country, the authors proceed to their proper subject—the detailed account of the vertebrates, which includes both the terrestrial and the marine forms. In the classification of the birds they follow in the main the scheme of Mr. H. Saunders, and though they suggest that some amendments might perhaps have been made had it not been for the sake of uniformity with the "Fauna of Orkney," yet we are glad to know from his volume in the Cambridge "Natural History" that Mr. Evans, at least, is no friend to the plan of unnecessarily multiplying the genera of British birds, nor to the "*Scomber scomber*" principle.

In the classification of mammals, especially when we note the statement that Mr. Eagle Clarke has *carefully* revised the proofs, it is somewhat surprising to find the narwhal included among the *Physeteridae*. Neither do we see the necessity of regarding the porquas as the representatives of a family by themselves. But, altogether apart from such trivial details, we must take exception to the practice of including introduced species among mammalian faunas. In the present instance the authors note five species of rodents as belonging to the Shetland fauna, whereas only one of these—*Mus sylvaticus*—is really indigenous. The trouble such methods cause to those who have occasion to write on the geographical distribution of animals is best known to themselves. If introduced forms are mentioned at all, their foreign origin ought to be indicated in such a manner that it will catch the eye of the reader at the first glance. In the case of birds, such as the ruff, which but rarely visit the islands, some conspicuous notification of the fact would likewise be advantageous, although we are ready to acknowledge that the line between regular visitors and accidental stragglers is very hard to draw.

The above mention of *Mus sylvaticus*—the long-tailed field-mouse—reminds us that one of the most important objects of histories of island faunas is to point out whether the indigenous animals are in any way distinguishable from those inhabiting the nearest mainland. In the case of birds of strong flight such differences are not likely to occur, but they should be looked for in birds that never leave their island home, and in the indigenous mammals. On the special characters of the Shetland field-mouse the authors are silent, which in view of Mr. Barrett-Hamilton's recent recognition of a peculiar representative of this type in St. Kilda is distinctly to be regretted. In the case of the common wren, which has likewise a peculiar local race in St. Kilda, the authors state that the Shetland form differs to a certain extent from the one found on the Scottish mainland, although not, in their opinion, sufficiently so as to be entitled to be regarded as representing a distinct race. If this be so, and the field-mouse be indistinguishable from the mainland form, it suggests that the Shetlands have been separated from the mainland at a later date than have the Hebrides;—but this is just one of the cases where